

8/11/2016

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica St. Louis
13715 Rider Trail North
Earth City, MO 63045
Tel: (314)298-8566

TestAmerica Job ID: 160-18417-1

TestAmerica Sample Delivery Group: SL2266
Client Project/Site: X16-049

For:

CH2M Hill Plateau Remediation Company
PO BOX 1600, MS H8-41
Richland, Washington 99352

Attn: Mr. Scot Fitzgerald



Authorized for release by:
8/11/2016 1:10:04 PM

Jayna Awalt, Project Manager II
(314)298-8566
jayna.awalt@testamericainc.com

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Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Job ID: 160-18417-1

Laboratory: TestAmerica St. Louis

Narrative

CASE NARRATIVE

CH2M Hill Plateau Remediation Company
P.O. Box 1600
Richland, Washington 99352
August 11, 2016
Attention: Scot Fitzgerald

SDG	: SL2266
Number of Samples	: 2 samples
Sample Matrix	: Water
Data Deliverable	: Summary
Date SDG Closed	: August 4, 2016

II. Introduction

On July 30 and August 4, 2 samples were received by TestAmerica - St. Louis for chemical analysis. The samples were received within temperature criteria. See the COC and receipt checklists for documentation of any variations on receipt conditions and temperature. Upon receipt, samples were given laboratory Ids to correspond with specific client Ids. Please refer to the Sample Summary sheets attached to this case narrative. This report is incomplete without the narrative.

The following SAFs are associated with this SDG: X16-049

III. Analytical Results/ Methodology

The analytical results for this report are presented by analytical test. Each set of data includes sample identification information, analytical results and the appropriate detection limits. All results are based upon samples as they were received, i.e. wet weight, unless otherwise noted on the data sheets. See the attached Methods Summary Form for the methods used in this SDG.

MS/MSD/Dup analysis was done per the client requirements. Analytical batches that did not contain matrix QC were analyzed with an LCS/LCS duplicate.

Note: For Metals analyses, per standard practice, all 6020 water and soil samples are initially prepared at 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate flagging unless otherwise noted in the case narrative.

For solid matrices, all Metals analyses (including Hg) use a Standard Reference Material for the Laboratory Control Sample (LCS). Certificate for this source material may be obtained from TASL.

For Anion analysis, samples have been started at a 2x dilution per CHPRC direction. The samples are flagged accordingly with a "D" flag if sample concentration is above the MDL/RL. Non-conformance will be included in the below section only if dilution is greater than 2x.

For WTPH methods, the lab utilizes method 8015B. Per CHPRC direction, the method name in the electronic data has been modified to read WTPH in the place of 8015B.

Per CHPRC direction (June 2014), Boron will be reported for Metals using method 6010. Boron will no longer be reported by method 6020.

Per CHPRC direction, due to the short hold times for Nitrate, Nitrite and Phosphate by IC (48 hours) as well as pH analysis (24 hours), a SIR request is not needed when samples are run outside 1x hold but within 2x hold. A narrative comment will be included below if a sample is run outside the lab-specified hold time for waters.

Case Narrative

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Job ID: 160-18417-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

For extractable and volatile organic analyses, several analytes are considered poor performers and will not meet CHPRC QC limits. Per CHPRC direction, the lab's statistical limits have been reported. Excursions outside these statistical limits will include a non-conformance in the sections below.

IV. Definitions

QCBLK-	Quality Control Blank, Method Blank
QCLCS-	Quality Control Laboratory Control Sample, Blank Spike
DUP-	Laboratory Duplicate
MS-	Matrix Spike
MSD-	Matrix Spike Duplicate

The term "Detection Limit" used in the analytical data report refers to either the lab's standard reporting limits or contractually required reporting limits, whichever is applicable.

The following data qualifiers may be applicable to the results in this report, as appropriate.

- **B** - For inorganic analyses, the sample result is greater than the MDL but less than the RL.
- **B** - For organic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **J** - For organic analyses, the sample is estimated and less than the RL.
- **C** - For inorganic analyses, Method Blank contamination. The Method Blank contains the target analyte at a concentration above the MDL.
- **D** - For all analyses, the sample result was obtained from the analysis of a dilution. For Metals analyses, per standard practice, all solid samples are initially prepared at a 2x dilution. This standard dilution does not affect reporting limits as MDL studies are also prepared in the same manner. These dilutions do not necessitate qualification unless otherwise noted in the case narrative.
- **N** - For inorganics and GC analyses, the spike/spike duplicate recoveries are outside QC limits.
- **T** - For GCMS analyses, the spike/spike duplicate recoveries are outside QC limits.
- **O** - For all analyses, the LCS (LCSD) recoveries are outside QC limits.
- **M** - For inorganic analyses, the precision was outside control limits.
- **P** - For organic analyses (PCB/Pests only), the aroclor target analyte has greater than 25% difference for detected concentrations between the two GC columns.

Volatiles

Batch: 263741

The following compounds did not meet the minimum relative response factor limits in the continuing calibration verification (CCV) associated with batch 263741: Acetone, 2- Butanone, 4- Methyl- 2- pentanone and 2- Hexanone. A low level CCV was analyzed at the reporting limit (1ug/L) and the affected analytes were detected. Target analytes recovering above the reporting limit will be qualified and reported. (CCVIS 160-263741/5)

The matrix spike / matrix spike duplicate (MS/MSD) recoveries for analytical batch 160-263741 were outside control limits for Acetone. Sample matrix interference is suspected because the associated laboratory control samples (LCS/LCSD) recoveries were within acceptance limits. (160-18441-B-4 MS) and (160-18441-C-4 MSD) This analyte has been qualified accordingly with a "T" flag in the associated samples.

There were no observations or non-conformances associated with the following methods:

Alkalinity

We certify that this data package is in compliance with the SOW, both technically and for completeness, including a full description of, explanation of, and corrective actions for, any and all deviations, from either the analyses requested or the case narrative requested. Release of the data contained in this hard copy data package has been authorized by the Laboratory Analytical Manager or designee and

Case Narrative

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Job ID: 160-18417-1 (Continued)

Laboratory: TestAmerica St. Louis (Continued)

the laboratory's client services representative as verified by their signature on this report.

Reviewed and approved:

Jayna Awalt
St. Louis Project Manager

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Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-18417-1

SDG Number: SL2266

Login Number: 18417

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.9
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

76105

8/11/2016

CH2MHill Plateau Remediation Company **92266** **C.O.C.# X16-049-094**
CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST
 Page 1 of 1

Collector CHRIS FULTON CHPRC
SAF No. X16-049
Project Title 100-KW Rebound Study, July 25, 2016
Shipped To (Lab) TestAmerica St. Louis
Protocol CERCLA
Contact/Requester Karen Waters-Husted
Sampling Origin Hanford Site
Logbook No. HNF-N-506 87 / 12
Method of Shipment Commercial Carrier
Priority: 30 Days **PRIORITY**
Telephone No. 509-376-4650
Purchase Order/Charge Code 304027
Ice Chest No. GWS-458 8065 4238
Bill of Lading/Air Bill No. 17768 808300305
Offsite Property No. N/A 040. 7/25/16

POSSIBLE SAMPLE HAZARDS/REMARKS
 *** Contains Radioactive Material at concentrations that are not regulated for transportation per 49 CFR / IATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1

Sample No.	Filter	* Date	Time	No/Type Container	Sample Analysis	Holding Time	Preservative
B36728	N	W 7/29/16	1046	1x500-mL GIP	310.1_ALKALINITY: GW 01	14 Days	Cool <=6C

Relinquished By	Print	Sign	Date/Time	Received By	Print	Sign	Date/Time	Matrix *
CHRIS FULTON			JUL 29 2016 1145	Troy Bacon CHPRC	Troy Bacon CHPRC		JUL 29 2016 1145	DS - Drum Solids DL - Drum Liquids T - Tissue WI - Wipe L - Liquid V - Vegetation Other - Other
Relinquished By			JUL 29 2016 1400	FEDEX	FEDEX			
Relinquished By			FEDEX	JILL CLARKE	JILL CLARKE		7.30.16 0840	
Relinquished By								
FINAL SAMPLE DISPOSITION	Disposal Method (e.g., Return to customer, per lab procedure, used in process)							Date/Time





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776880654238

Ship date:

Fri 7/29/2016

Actual delivery:

Sat 7/30/2016 8:26 am

RICHLAND, WA US

Delivered

Signed for by: J.CLARKE

EARTH CITY, MO US

Travel History

Date/Time	Activity	Location
7/30/2016 - Saturday		
8:26 am	Delivered	EARTH CITY, MO
8:02 am	On FedEx vehicle for delivery	EARTH CITY, MO
7:24 am	At local FedEx facility	EARTH CITY, MO
5:17 am	At destination sort facility	BERKELEY, MO
4:33 am	Departed FedEx location	MEMPHIS, TN
12:48 am	Arrived at FedEx location	MEMPHIS, TN
7/29/2016 - Friday		
4:50 pm	Left FedEx origin facility	PASCO, WA
4:09 pm	Shipment information sent to FedEx	
3:04 pm	Picked up	PASCO, WA

Shipment Facts

Tracking number	776880654238	Service	FedEx Priority Overnight
Weight	76 lbs / 34.47 kgs	Delivered To	Shipping/Receiving
Total pieces	1	Total shipment weight	76 lbs / 34.47 kgs
Terms	Recipient	Shipper reference	GWS-458
Packaging	Your Packaging	Special handling section	For Saturday Delivery, Additional Handling Surcharge
Standard transit	7/30/2016 by 12:00 pm		



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Login Sample Receipt Checklist

Client: CH2M Hill Plateau Remediation Company

Job Number: 160-18468-1

SDG Number: SL2266

Login Number: 18468

List Number: 1

Creator: Clarke, Jill C

List Source: TestAmerica St. Louis

Question	Answer	Comment
Radioactivity wasn't checked or is \leq background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.8
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ ($1/4''$).	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



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776912387620

Ship date:

Wed 8/03/2016

RICHLAND, WA US

Actual delivery:

Thu 8/04/2016 8:07 am

EARTH CITY, MO US

Delivered

Signed for by: B.DANIELS

Travel History

Date/Time	Activity	Location
8/04/2016 - Thursday		
8:07 am	Delivered	EARTH CITY, MO
6:44 am	On FedEx vehicle for delivery	EARTH CITY, MO
6:38 am	At local FedEx facility	EARTH CITY, MO
5:12 am	At destination sort facility	BERKELEY, MO
4:19 am	Departed FedEx location	MEMPHIS, TN
12:08 am	Arrived at FedEx location	MEMPHIS, TN
8/03/2016 - Wednesday		
4:56 pm	Left FedEx origin facility	PASCO, WA
3:18 pm	Picked up	PASCO, WA
3:02 pm	Shipment information sent to FedEx	

Shipment Facts

Tracking number	776912387620	Service	FedEx Standard Overnight
Weight	41 lbs / 18.6 kgs	Delivered To	Shipping/Receiving
Total pieces	1	Total shipment weight	41 lbs / 18.6 kgs
Terms	Recipient	Shipper reference	GWS-430
Packaging	Your Packaging	Special handling section	Deliver Weekday, Additional Handling Surcharge
Standard transit	8/04/2016 by 3:00 pm		



Search or tracking number

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- FedEx Ship Manager Software
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Definitions/Glossary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
T	MS, MSD: Recovery exceeds upper or lower control limits.
U	Analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
U	Analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Method Summary

Client: CH2M Hill Plateau Remediation Company
 Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
 SDG: SL2266

Method	Method Description	Protocol	Laboratory
8260C	Volatile Organic Compounds (GC/MS)	SW846	TAL SL
310.1	Alkalinity	MCAWW	TAL SL

Protocol References:

MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
 SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566



Sample Summary

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
160-18417-1	B36728	Water	07/29/16 10:46	07/30/16 08:40
160-18468-1	B366Y5	Water	08/02/16 08:50	08/04/16 08:15

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Client Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049TestAmerica Job ID: 160-18417-1
SDG: SL2266

Method: 8260C - Volatile Organic Compounds (GC/MS)

Client Sample ID: B366Y5
Date Collected: 08/02/16 08:50
Date Received: 08/04/16 08:15Lab Sample ID: 160-18468-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.17	U	1.0	0.17	ug/L			08/08/16 13:00	1
1,1,2-Trichloroethane	0.13	U	1.0	0.13	ug/L			08/08/16 13:00	1
1,1-Dichloroethane	0.070	U	1.0	0.070	ug/L			08/08/16 13:00	1
1,1-Dichloroethene	0.10	U	1.0	0.10	ug/L			08/08/16 13:00	1
1,2-Dichloroethane	0.22	U	1.0	0.22	ug/L			08/08/16 13:00	1
2-Butanone (MEK)	0.82	J	5.0	0.47	ug/L			08/08/16 13:00	1
4-Methyl-2-pentanone (MIBK)	0.22	U	5.0	0.22	ug/L			08/08/16 13:00	1
Acetone	4.1	T	2.0	0.55	ug/L			08/08/16 13:00	1
Benzene	0.10	U	1.0	0.10	ug/L			08/08/16 13:00	1
Carbon disulfide	0.10	U	1.0	0.10	ug/L			08/08/16 13:00	1
Carbon tetrachloride	0.18	U	1.0	0.18	ug/L			08/08/16 13:00	1
Chlorobenzene	0.11	U	1.0	0.11	ug/L			08/08/16 13:00	1
Chloroform	0.44	J	1.0	0.10	ug/L			08/08/16 13:00	1
Ethylbenzene	0.12	U	1.0	0.12	ug/L			08/08/16 13:00	1
Methylene Chloride	0.27	U	1.0	0.27	ug/L			08/08/16 13:00	1
Tetrachloroethene	0.18	U	1.0	0.18	ug/L			08/08/16 13:00	1
Toluene	0.14	U	1.0	0.14	ug/L			08/08/16 13:00	1
Trichloroethene	1.9		1.0	0.25	ug/L			08/08/16 13:00	1
Vinyl chloride	0.19	U	2.0	0.19	ug/L			08/08/16 13:00	1
Xylenes, Total	0.26	U	3.0	0.26	ug/L			08/08/16 13:00	1

Tentatively Identified Compound	Est. Result	Qualifier	Unit	D	RT	CAS No.	Prepared	Analyzed	Dil Fac
Tentatively Identified Compound	None		ug/L					08/08/16 13:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	98		75 - 129		08/08/16 13:00	1
4-Bromofluorobenzene (Surr)	110		81 - 130		08/08/16 13:00	1
Dibromofluoromethane (Surr)	103		81 - 124		08/08/16 13:00	1
Toluene-d8 (Surr)	109		87 - 128		08/08/16 13:00	1

General Chemistry

Client Sample ID: B36728
Date Collected: 07/29/16 10:46
Date Received: 07/30/16 08:40Lab Sample ID: 160-18417-1
Matrix: Water

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	130		5.0	0.54	mg/L			08/03/16 09:41	1
Bicarbonate Alkalinity	130		5.0	0.54	mg/L			08/03/16 09:41	1
Carbonate Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1
Hydroxide Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
SDG: SL2266

Method: 8260C - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 160-263741/9

Matrix: Water

Analysis Batch: 263741

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	0.17	U	1.0	0.17	ug/L			08/08/16 09:50	1
1,1,2-Trichloroethane	0.13	U	1.0	0.13	ug/L			08/08/16 09:50	1
1,1-Dichloroethane	0.070	U	1.0	0.070	ug/L			08/08/16 09:50	1
1,1-Dichloroethene	0.10	U	1.0	0.10	ug/L			08/08/16 09:50	1
1,2-Dichloroethane	0.22	U	1.0	0.22	ug/L			08/08/16 09:50	1
2-Butanone (MEK)	0.47	U	5.0	0.47	ug/L			08/08/16 09:50	1
4-Methyl-2-pentanone (MIBK)	0.22	U	5.0	0.22	ug/L			08/08/16 09:50	1
Acetone	0.55	U	2.0	0.55	ug/L			08/08/16 09:50	1
Benzene	0.10	U	1.0	0.10	ug/L			08/08/16 09:50	1
Carbon disulfide	0.10	U	1.0	0.10	ug/L			08/08/16 09:50	1
Carbon tetrachloride	0.18	U	1.0	0.18	ug/L			08/08/16 09:50	1
Chlorobenzene	0.11	U	1.0	0.11	ug/L			08/08/16 09:50	1
Chloroform	0.10	U	1.0	0.10	ug/L			08/08/16 09:50	1
Ethylbenzene	0.12	U	1.0	0.12	ug/L			08/08/16 09:50	1
Methylene Chloride	0.27	U	1.0	0.27	ug/L			08/08/16 09:50	1
Tetrachloroethene	0.18	U	1.0	0.18	ug/L			08/08/16 09:50	1
Toluene	0.14	U	1.0	0.14	ug/L			08/08/16 09:50	1
Trichloroethene	0.25	U	1.0	0.25	ug/L			08/08/16 09:50	1
Vinyl chloride	0.19	U	2.0	0.19	ug/L			08/08/16 09:50	1
Xylenes, Total	0.26	U	3.0	0.26	ug/L			08/08/16 09:50	1

Tentatively Identified Compound	MB Est. Result	MB Qualifier	Unit	D	RT	CAS No.	Prepared	Analyzed	Dil Fac
Tentatively Identified Compound	None		ug/L					08/08/16 09:50	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	93		75 - 129		08/08/16 09:50	1
4-Bromofluorobenzene (Surr)	106		81 - 130		08/08/16 09:50	1
Dibromofluoromethane (Surr)	103		81 - 124		08/08/16 09:50	1
Toluene-d8 (Surr)	105		87 - 128		08/08/16 09:50	1

Lab Sample ID: LCS 160-263741/6

Matrix: Water

Analysis Batch: 263741

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,1,1-Trichloroethane	10.0	10.4		ug/L		104	85 - 116
1,1,2-Trichloroethane	10.0	9.44		ug/L		94	80 - 120
1,1-Dichloroethane	10.0	10.1		ug/L		101	80 - 120
1,1-Dichloroethene	10.0	10.4		ug/L		104	80 - 120
1,2-Dichloroethane	10.0	9.46		ug/L		95	80 - 115
2-Butanone (MEK)	10.0	9.35		ug/L		94	67 - 127
4-Methyl-2-pentanone (MIBK)	10.0	9.83		ug/L		98	75 - 126
Acetone	10.0	11.7		ug/L		117	69 - 129
Benzene	10.0	10.1		ug/L		101	80 - 120
Carbon disulfide	10.0	10.6		ug/L		106	80 - 121
Carbon tetrachloride	10.0	10.5		ug/L		105	83 - 125
Chlorobenzene	10.0	10.2		ug/L		102	80 - 120

TestAmerica St. Louis

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049TestAmerica Job ID: 160-18417-1
SDG: SL2266

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 160-263741/6

Matrix: Water

Analysis Batch: 263741

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloroform	10.0	10.1		ug/L		101	80 - 120
Ethylbenzene	10.0	9.64		ug/L		96	80 - 120
Methylene Chloride	10.0	9.33		ug/L		93	80 - 120
Tetrachloroethene	10.0	11.2		ug/L		112	83 - 123
Toluene	10.0	10.5		ug/L		105	80 - 120
Trichloroethene	10.0	10.5		ug/L		105	80 - 120
Vinyl chloride	10.0	10.0		ug/L		100	77 - 122
Xylenes, Total	20.0	20.8		ug/L		104	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	92		75 - 129
4-Bromofluorobenzene (Surr)	98		81 - 130
Dibromofluoromethane (Surr)	106		81 - 124
Toluene-d8 (Surr)	98		87 - 128

Lab Sample ID: LCSD 160-263741/7

Matrix: Water

Analysis Batch: 263741

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
1,1,1-Trichloroethane	10.0	10.8		ug/L		108	85 - 116	3	20
1,1,2-Trichloroethane	10.0	9.99		ug/L		100	80 - 120	6	20
1,1-Dichloroethane	10.0	10.4		ug/L		104	80 - 120	3	20
1,1-Dichloroethene	10.0	11.1		ug/L		111	80 - 120	7	20
1,2-Dichloroethane	10.0	9.41		ug/L		94	80 - 115	1	20
2-Butanone (MEK)	10.0	9.54		ug/L		95	67 - 127	2	20
4-Methyl-2-pentanone (MIBK)	10.0	9.66		ug/L		97	75 - 126	2	20
Acetone	10.0	11.3		ug/L		113	69 - 129	4	20
Benzene	10.0	10.8		ug/L		108	80 - 120	6	20
Carbon disulfide	10.0	11.2		ug/L		112	80 - 121	6	20
Carbon tetrachloride	10.0	10.9		ug/L		109	83 - 125	3	20
Chlorobenzene	10.0	10.3		ug/L		103	80 - 120	1	20
Chloroform	10.0	10.5		ug/L		105	80 - 120	3	20
Ethylbenzene	10.0	9.51		ug/L		95	80 - 120	1	20
Methylene Chloride	10.0	9.71		ug/L		97	80 - 120	4	20
Tetrachloroethene	10.0	11.1		ug/L		111	83 - 123	0	20
Toluene	10.0	10.3		ug/L		103	80 - 120	1	20
Trichloroethene	10.0	10.7		ug/L		107	80 - 120	1	20
Vinyl chloride	10.0	10.3		ug/L		103	77 - 122	2	20
Xylenes, Total	20.0	20.9		ug/L		105	80 - 120	0	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	95		75 - 129
4-Bromofluorobenzene (Surr)	99		81 - 130
Dibromofluoromethane (Surr)	108		81 - 124
Toluene-d8 (Surr)	99		87 - 128

TestAmerica St. Louis

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
Project/Site: X16-049TestAmerica Job ID: 160-18417-1
SDG: SL2266

Method: 8260C - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: 160-18441-C-4 MSD

Matrix: Water

Analysis Batch: 263741

Client Sample ID: Matrix Spike Duplicate

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Toluene	0.14	U	10.0	10.3		ug/L		103	85 - 123	4	20
Trichloroethene	0.25	U	10.0	10.3		ug/L		103	81 - 125	5	20
Vinyl chloride	0.19	U	10.0	10.0		ug/L		100	70 - 129	8	20
Xylenes, Total	0.26	U	20.0	20.7		ug/L		104	80 - 120	3	20

Surrogate	MSD %Recovery	MSD Qualifier	MSD Limits
1,2-Dichloroethane-d4 (Surr)	99		75 - 129
4-Bromofluorobenzene (Surr)	97		81 - 130
Dibromofluoromethane (Surr)	106		81 - 124
Toluene-d8 (Surr)	100		87 - 128

Method: 310.1 - Alkalinity

Lab Sample ID: MB 160-263187/1

Matrix: Water

Analysis Batch: 263187

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1
Bicarbonate Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1
Carbonate Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1
Hydroxide Alkalinity	0.54	U	5.0	0.54	mg/L			08/03/16 09:41	1

Lab Sample ID: HLCS 160-263187/3

Matrix: Water

Analysis Batch: 263187

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	HLCS Result	HLCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	400	399.5		mg/L		100	90 - 110
Bicarbonate Alkalinity	400	399.5		mg/L		100	90 - 110

Lab Sample ID: LCS 160-263187/2

Matrix: Water

Analysis Batch: 263187

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	200	187.5		mg/L		94	90 - 110
Bicarbonate Alkalinity	200	187.5		mg/L		94	90 - 110

Lab Sample ID: 160-18295-A-3 MS

Matrix: Water

Analysis Batch: 263187

Client Sample ID: Matrix Spike

Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	100		100	192.0		mg/L		92	80 - 120
Bicarbonate Alkalinity	100		100	192.0		mg/L		92	80 - 120

TestAmerica St. Louis

QC Sample Results

Client: CH2M Hill Plateau Remediation Company
 Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
 SDG: SL2266

Method: 310.1 - Alkalinity (Continued)

Lab Sample ID: 160-18295-A-3 DU
 Matrix: Water
 Analysis Batch: 263187

Client Sample ID: Duplicate
 Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Alkalinity	100		100.0		mg/L		0	20
Bicarbonate Alkalinity	100		100.0		mg/L		0	20
Carbonate Alkalinity	0.54	U	0.54	U	mg/L		NC	20
Hydroxide Alkalinity	0.54	U	0.54	U	mg/L		NC	20



QC Association Summary

Client: CH2M Hill Plateau Remediation Company
 Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
 SDG: SL2266

GC/MS VOA

Analysis Batch: 263741

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18468-1	B366Y5	Total/NA	Water	8260C	
MB 160-263741/9	Method Blank	Total/NA	Water	8260C	
LCS 160-263741/6	Lab Control Sample	Total/NA	Water	8260C	
LCSD 160-263741/7	Lab Control Sample Dup	Total/NA	Water	8260C	
160-18441-B-4 MS	Matrix Spike	Total/NA	Water	8260C	
160-18441-C-4 MSD	Matrix Spike Duplicate	Total/NA	Water	8260C	

General Chemistry

Analysis Batch: 263187

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
160-18417-1	B36728	Total/NA	Water	310.1	
MB 160-263187/1	Method Blank	Total/NA	Water	310.1	
HLCS 160-263187/3	Lab Control Sample	Total/NA	Water	310.1	
LCS 160-263187/2	Lab Control Sample	Total/NA	Water	310.1	
160-18295-A-3 MS	Matrix Spike	Total/NA	Water	310.1	
160-18295-A-3 DU	Duplicate	Total/NA	Water	310.1	

Surrogate Summary

Client: CH2M Hill Plateau Remediation Company
 Project/Site: X16-049

TestAmerica Job ID: 160-18417-1
 SDG: SL2266

Method: 8260C - Volatile Organic Compounds (GC/MS)
Matrix: Water
Prep Type: Total/NA

Percent Surrogate Recovery (Acceptance Limits)

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		12DCE (75-129)	BFB (81-130)	DBFM (81-124)	TOL (87-128)
160-18441-B-4 MS	Matrix Spike	100	96	103	95
160-18441-C-4 MSD	Matrix Spike Duplicate	99	97	106	100
160-18468-1	B366Y5	98	110	103	109
LCS 160-263741/6	Lab Control Sample	92	98	106	98
LCSD 160-263741/7	Lab Control Sample Dup	95	99	108	99
MB 160-263741/9	Method Blank	93	106	103	105

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)

BFB = 4-Bromofluorobenzene (Surr)

DBFM = Dibromofluoromethane (Surr)

TOL = Toluene-d8 (Surr)